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PHYSIOLOGY.[1]

The Sixth Sense.—At a recent meeting of the Anthropological Institute, London, Mr. Francis Galton, F. R. S., exhibited and explained some apparatus contrived by himself, with a view of testing the muscular and other senses. This apparatus consisted of a box, something like a backgammon board, containing trays of weights arranged for measuring the relative delicacy of the muscular sense (the sixth added by modern psychological science to the five recognized by the ancients) as existing in different persons.

The principle Mr. Galton claimed as a new one. It established, he said, a graded scale of sensitivity, and was applicable, by means of analogous methods, to testing the delicacy of other senses, such as taste and smell. He employed small weights arranged in sequence, which were numbered in succession 1, 2, 3, etc., and differed by equally perceptible variations, as calculated by Weber's law. Hence if a person, A, could just distinguish, say, 1 and 3, he could also distinguish between any two weights two grades apart, as 2 and 4, 3 and 5, etc. Again, if another person, B, were twice as obtuse as A, he would be able to distinguish one grade only where A could distinguish two. In other words, he would be only just able to distinguish between weights 1 and 5, 2 and 6, and so on.

Generally, the number of grades between the weights that any person could distinguish had to be found by trials, and that number became the measure of the coarseness of his sensitivity. The weights used were blank cartridges, filled with shot and wadding, care being taken that the shot should be equally distributed. They were arranged in trays, each tray holding a sequence of three. The person tested had to arrange the cartridges in the tray handed to him in the true order of their weights.

Some provisional results of the plan were mentioned. One was that men had, on the whole, more delicacy of discrimination than women; another, that intellectually able men had more than other men. It further appeared that women sensitive to a morbid degree were not remarkable for their powers of discrimination. Sensation was produced in them by a feeble stimulus, and so was pain, but the intervening numbers of just perceptible differences did not appear in their case to be exceptionally large.

Atlas of Embryology.—The "Selections from Embryological Monographs," compiled by Messrs. Agassiz, Faxon and Mark, of the Museum of Comparative Zoölogy at Cambridge, will form an invaluable atlas of drawings selected from the best authorities. It will, when completed, be a most timely publication for students in the United States, and form an introduction to the literature of the subject, both bibliographical and pictorial. As stated by the projector of the series, Mr. Agassiz, the curator of the museum, these selections "will give to the student, in an easily accessible form, a more or less complete iconography of the embryology of each important group of the animal kingdom. This selection is not intended to be a hand-book, but rather an atlas to accompany any general work on the subject."

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[1] This department is edited by Professor Henry Sewall, of Ann Arbor, Michigan.

The Crustacea appeared last year, the bibliography having been prepared, and the plates selected by Professor W. Faxon. The lithographic work is well done, and considerable new matter by both Mr. Agassiz and Professor Faxon has been added in the plates; the most noteworthy being the early stages of the hermit crabs, and the barnacles. The phenomena connected with the fecundation and maturation of the egg, and the history of the formation of the embryonic layers, will be treated of in a separate part. The parts devoted to Echinoderms, Acalephs, and Polyps are in an advanced stage of preparation. We have detected no omissions of importance in the part already issued.

A MYRIOPOD WHICH PRODUCES PRUSSIC ACID.—In several of the hothouses in Holland, a Myriopod is frequently met with which (according to Herr Weber, of Utrecht), is a foreign species of the genus Fontaria, and has the remarkable property of producing prussic acid (HCy). Attention was called to this on finding that the animal, when excited, gave out a strong smell of oil of bitter almonds. The phenomenon is still more pronounced on bruising. Some specimens having been distilled with water, prussic acid was found in the distillate. Herr Egeling has lately made a series of experiments to test the view that this Myriopod prepares a substance which, under certain conditions, is decomposed, giving prussic acid as one of the products of decomposition. This was fully confirmed. By action of various reagents, a substance was detected, which is split up by water, yielding HCy. It further seemed probable that, besides this substance, the animals possess one which acts as a ferment, and which the author hopes to be able to separate.—*English Mechanic.*—[NOTE. The *Fontaria virginica*, a common Myriopod in Pennsylvania, has long been known to emit a powerful smell of Prussic acid.—E. D. COPE.]

THE TRACHEÆ AND THE SOURCE OF LIGHT IN FIRE-FLIES.—*Nature* gives an abstract of Wielowiejski's account in the *Zeitschrift für Wissenschaftliche Zoölogie*, of the light-producing organs in *Lampyris splendidula* and *noctiluca.* He sums up the most important results as follows: 1. The "tracheal terminal cells" of Schultze, which become black under osmic acid, are by no means—as their name would imply—the terminations of the respiratory tubes; for these branch out further on into brush-like masses of much finer capillaries, which are without the chitinous spiral; they are very attenuated, and making their way in to the peritoneal layer, are numerously distributed to phosphorescent tissue. 2. The tracheal capillaries very rarely end abruptly (blind) in the phosphorescent organs, but most frequently anastomose with one another, forming an irregular meshwork. 3. The capillaries do not seem to enter into the structure of the parenchymatous cells, but rather course along their surface, often irregularly winding around and enveloping these. 4. The tracheal terminal cells are nothing more than the outer elements of the peritoneal layer at the base of tracheal capillaries, which radiate in a brush-like fashion from a chitinous spiral trachea. 5. The tracheal terminal cells are not the seat or .point of departure of the light development. If this appears first in their vicinity it is only a consequence of the fact that these structures have, owing to their affinity for oxygen, stored up in themselves a supply of this gas, and give it off in greater quantity to the neighboring tissues. 6. The light-producing function is peculiar to the parenchyma cells of the light-producing organs. It results from a slow oxydation of a substance formed by them under the control of the nervous system. 7. The ventral light-organ was found to consist of two layers, the parenchyma-cells of which are quite similar to one another in their morphological characters, but they differ from one another in the chemical nature of their contents. 8. The parenchymatous cells (is this the case with all ?) seem connected with fine nerve-endings. 9. The light-organs are the morphological equivalents of the fatty bodies.

PSYCHOLOGY.

DREAMS.—

> " We are such stuff
> As dreams are made on."—*The Tempest.*

Shakespeare's lines may serve as the expression of a curious and important psychological truth. We may truly and philosophically be said to think and perceive, and therefore to exist exactly as dreams are made. For the only existence which we know is that presented to us in consciousness according to certain laws which prescribe precisely how we are to be conscious, not only of the outside world which comes to consciousness through the senses, but also of the internal world of our own mind.

For example, it is impossible for the mind to think intelligibly anything entirely by itself independent of all cause or effect; it is impossible to think a sensation such as coolness or a color like blue by themselves without any substance which is cool or body that is blue.

It is to this law of thought that dreams owe their origin; and which in their turn they serve to illustrate and explain as in other mental phenomenon can.

Let us take for example one of the commonest classes of dreams. It is a warm night, and a man is sleeping at an open window. At first all the senses are unexcited, and he sleeps